Iowa

CONTENT STANDARDS
and
BENCHMARKS

Information Technology

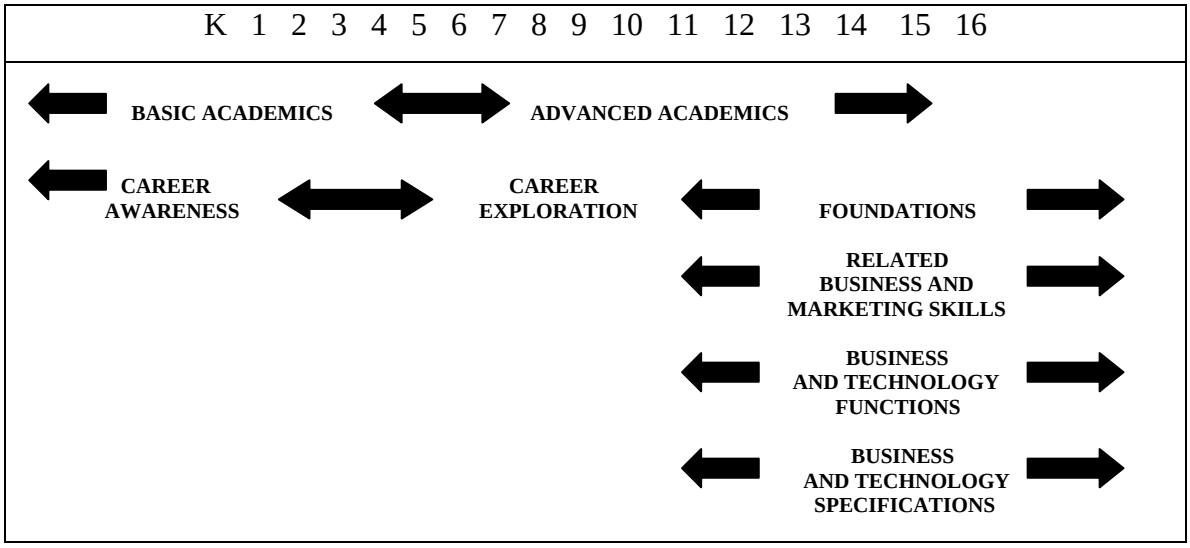
2001

Business, Information Management, and Marketing
Career Pathway Framework

Illustration of Program Possibilities

Career and Technical Programs Specific Technical Knowledge and Skills	Insurance	Facilities Management	General Management	Human Resources	Information Coordination	International Business	Banking	Nonprofit Resource Development	Office Technologies	Risk Management	Financial Services/Accounting	Entrepreneur	Customer Services	Advertising	E-Commerce	Importing/Exporting	International Marketing	Logistics Management	Marketing Research	Product Management	Professional Sales	Public Relations	Real Estate	Retail Management	Sales Management	Database Administration	Information Systems Operations	Interactive Digital Media Specialization	Network Administration	Programming and Systems Analysis	Software Development	Software Engineer	System Security	Technical Support	Technical Writer	Telecommunications	Web Designer/Developer	Multimedia Producer
Occupational Cluster	**Business**												**Marketing**													**Information Management**												
Career Area Knowledge and Skills	**Content and Knowledge of Career Areas—Standards and Benchmarks (K-12)**																																				
Employability	**Employability Knowledge and Skills—Standards and Benchmarks (K-12)**																																				
Academic	**Academic Knowledge and Skills (K-12)**																																				

The Business and Technology Curriculum



This flow chart describes how the Information Technology curriculum can be viewed as a continuum that begins in the primary grades with career awareness and exploration. The model continues through postsecondary education with the emphasis becoming more specialized to the student's individual interest in Business and Technology.

Information Technology
Model Standards and Benchmarks

Examples of Programs Utilizing Information Technology Model Standards and Benchmarks: Computer and Information Sciences, Computer Engineering Tech./Technical, Computer Maintenance Tech./Technician, Computer Installer and Repairer, and Management Information Systems

Foundations of Information Technology: Business Skills, Technical Skills, Communication

Functions of Information Technology: Design, Support/Systems Administration, Developing and Testing

Integrated Throughout the Curriculum: Academic Concepts, Technology, Soft Skills, and Ethics

Definitions

Foundations: The Foundations are fundamental to an understanding of business and technology and can be viewed as co-requisites and as prerequisites for information technology. The content of the Information Technology Foundations must be mastered in order for business-specific content to have relevance to student learning.

Functions: The Functions define the discipline of information technology as applied in business operations. They address information technology from the perspective of how it is practiced.

Soft Skills: Learning new technologies; reading, writing, computing; listening and oral communications, including following directions; adaptability: creative thinking/problem solving; personal management: self-esteem, goal setting, motivation, personal/career development, following through; group effectiveness: interpersonal relations, negotiation, teamwork with coworkers/clients; multitasking; time management/prioritizing; and organizational effectiveness/leadership.

Information Technology Standards and Benchmarks

The following are the Standards, Benchmarks, and Performance Indicators that are arranged according to Functions and Foundations.

Foundations:

Business Skills

Standard: Understand business concepts, tools, and creativity necessary in the workplace

Benchmarks

1. Utilize basic business machines (e.g., printers, phone, fax machines, digital cameras, data projector, scanners, hand-held computing devices)

   Performance Indicators

   - Demonstrate touch keyboarding and use computer functions to create documents
   - Select and use appropriate tools for solving problems
   - List the functionality of business machines and identify proper usage
2. Describe e-business and potential opportunities
   - Define e-business and components
   - Describe types of e-business (e.g., business to business, business to end customer)
   - List current e-businesses and products
   - Compare and contrast good vs. bad e-business models
3. Demonstrate workplace expectations (e.g., dress, promptness, attendance, interpersonal skills, completion of assigned tasks)
   - Identify and list workplace expectations
   - Compare school expectations to work expectations
   - Demonstrate punctuality
   - Demonstrate interpersonal skills through teamwork
4. Discuss organizational structures and problems facing IT departments
   - Identify the organizational structure of an IT department
   - Identify the chain of command, the communication channels and protocol within an organizational structure
   - List types of issues and problems within an IT department
5. Demonstrate ability to measure (e.g., results, metrics, statistics)
   - Use domestic and international standards of measurement in solving problems
   - Recognize the value of using fundamental statistics to determine the validity of results

Technical Skills

Standard: Understand the basic skills necessary for life skills in a technological society

Benchmarks

1. Demonstrate a good understanding of the major operating systems
   Performance Indicators
   - Successfully operate a multimedia computer system with related peripheral devices
   - Use office application software tools
   - Identify data communications and network protocols
   - Use terminology related to computers and technology appropriately in written and oral communications
2. Use logic to solve problems
   - Show ability to resolve conflicts with expressed needs
   - Use communications skills to obtain customer approval
   - Knowledge of negotiation variables
   - Use specific-purpose electronic devices (i.e., a graphing calculator, scientific probeware, multi-function keyboards) in appropriate content areas
3. Identify components of a computer system
   - Describe how computers may be connected to form a telecommunication network
   - Analyze and solve simple hardware and software problems
   - Identify system components
   - Show ability to learn commercial off-the shelf computing products
   - Describe technology constraints
4. Demonstrate computer skills (e.g., copy, file, save, folder maintenance)
   - Demonstrate touch keyboarding skills in computer use
   - Demonstrate operation of word processing, spreadsheet, database application software
   - Show working knowledge of networks and online resources
   - Use knowledge bases and online resources
5. Demonstrate the ability to use technical documentation
   - Demonstrate use of installation documentation and reference material
   - Demonstrate the ability to handle installation obstacles

6. Demonstrate trouble-shooting skills
   - Explain the impact of the installation plan on whole system
   - Evaluate installation processes and suggest continuous improvement
   - Knowledge of installation requirements
   - Knowledge of operating environments, office suite applications, networks, hardware tools and online resources
7. Obtain practical hands-on experience
   - Explain the importance of exploring options without bias
   - Explain how to use a call tracking system
   - List information gathering methods
   - Determine when sufficient information has been gathered
8. Apply knowledge of work processing, spreadsheet, relational database, e-mail, Internet, presentation software
   - Demonstrate the key functions of operating systems, networks, and Internet tools
   - Demonstrate the key functions of word processing and presentation software
   - Demonstrate the key functions of networks and online resources
   - Create concise report

Communication

Standard: Understand concepts, strategies, and systems needed to interact effectively with others

Benchmarks

1. Understand customer service skills

   Performance Indicators
   - Explain the importance of obtaining customer approval
   - Demonstrate the ability to plan according to people and resource needs and constraints
   - Explain the importance of obtaining customer approval of requirements
   - Identify customer expectations in a given situation
2. Create appropriate documentation
   - Use word processing and presentation software to create documentation
   - Create concise report

- Explain the concept of support boundaries
- Use available resources to gather information

3. Demonstrate ability to communicate technical issues in a non-technical manner
   - Explain multiple operating system environments
   - Describe networks and online resources
   - Explain the importance of obtaining feedback from customer and adjusting actions accordingly
   - Read and apply technical documentation
4. Demonstrate ability to train users on technical information
   - Explain the principles of networking
   - Describe operating environments, office suite applications, networks, hardware tools and online resources
   - Demonstrate ability to use multiple operating systems, applications, and hardware
   - Use office application software tools
5. Demonstrate the ability to work as a team member
   - Offer contrasting viewpoints
   - Identify an ultimate goal
   - Define and communicate workload limits
   - Understand the importance of communicating with others
6. Determine technical needs of an audience and communicate those needs
   - Explain technology constraints
   - Ask specific technical questions
   - Describe data communications and network protocols
   - Determine when sufficient information has been gathered

Functions:

Design

Standard: Understand functionality, scalability, and cost effectiveness of project design

Benchmarks

1. Demonstrate ability to use concept maps in design (i.e., build strong thinking skills with visual learning)

   Performance Indicators
   - List the rational behind concept maps
   - Demonstrate the use of a concept map

2. Explain the importance of creating user-friendly electronic interactive media
    - Design a flow chart showing user interfaces
    - Document user keyboard and mouse interactions
    - Explain how a program would recover from user input errors
3. Explain the importance of color in graphic/visual images/presentation
    - Show a color wheel that represents complementary colors available in computer graphics
    - Compare and contrast good and bad examples of graphic design
4. List the capabilities of various media
    - List media types and discuss usefulness, appropriateness, reliability and features to complete a design project
5. Explain the relationship between cost of developing a project and the company's bottom line
    - Estimate costs and schedule employees on a small design project
    - Explain return on investment (ROI)
    - Discuss total cost of ownership (i.e., cost implication for various methods of solutions to the design project)
6. Create a basic web site
    - Demonstrate the use of a web authoring tool to create a web site
    - List possible objects useful in creating a web site
    - Use a file transfer software to upload web site to a web server
7. Create a beginning level multimedia presentation
    - List the capabilities of different multimedia software applications
    - Use a presentation software application to create an electronic presentation
8. Explain capabilities of development applications
    - Identify various development applications
    - Compare and contrast similar development application products
9. Define the seven layers of the OSI model
    - List the seven layers of the OSI model
    - Describe the major functions completed at each level
    - List the reasons for the layered approach to the OSI model
10. Explain the key concepts of relational databases
    - Perform a link between two databases on one field
    - Explain the rational for relational databases

11. Recognize legal and ethical issues related to information technology (e.g., hacking, viruses, security, copyright)
    - List damaging hacking activities, viruses and other security problems for a business
    - Research the penalties for software copyright violations
    - Research the Code of Ethics for a professional IT organization such as Association of Information Technology Professional
    - Apply copyright and fair use guidelines of software

Support/Systems Administration

Standard: Understand hardware and software support issues that affect end users

Benchmarks

1. Explain the relationship between cost of implementation and day-to-day operations with company's bottom line

   Performance Indicators
   - Estimate the cost to run a small help desk with 3 employees for a year
   - Evaluate the costs of a project in your local school and support costs associated with the project
   - Discuss total cost of ownership
2. Demonstrate effective customer services skills (e.g., patience, courtesy, identify customer expectations, promptness)
   - Role play customer help desk situations
   - Demonstrate the proper dress for business situations
   - Understand the importance of a positive attitude
3. Demonstrate the ability to convey information regarding technical material
   - Explain clearly the instructions for a computer task to another individual
   - Conduct task specific training and coach others to apply related concepts
4. Explain the importance of backing up data and maintaining data integrity
   - Identify possible sources of data lost
   - Identify methods and technologies for preserving data
   - List the steps required for effective backup and recovery

5. Explain the importance of security of data (e.g., privacy of information, confidentiality, restricted use by authorized personnel)
    - Demonstrate an awareness of technological advances and availability of resources
    - Understand the need for confidentiality
    - Identify sources of security problems with data
    - Identify methods of data protection
6. Demonstrate the ability to use general use software (e.g., word processing, database, spreadsheet, presentation)
    - Create a word processing document (e.g., using a table, mail merge)
    - Create a spreadsheet document (e.g., using formulas, lookups)
    - Create a database (e.g., more than one table, queries and reports)
    - Create an electronic presentation (e.g., sound and graphics)
7. Identify the basic components of a network
    - Identify types of networks and their capabilities (e.g., LAN, WAN, MAN)
    - Identify network topologies and protocols
    - Identify LAN (Local Area Network) trends and issues
    - List network devices and functions (e.g., repeater, hub, bridge, switch, router)
    - Demonstrate a fundamental understanding of the OSI Model
    - Identify and list networking media (e.g., cable types – 10base2, 10base5, 10baseT, Fiber)

Developing and Testing

Standard: Understand the importance of testing before, during and after project implementation

Benchmarks

1. Demonstrate ability to use concept maps in developing and testing design (i.e., build strong thinking skills with visual learning)

Performance Indicators

- List the rational behind concept maps use in testing
- Demonstrate the use of a concept map in developing and testing

2. Demonstrate the ability to test a new web site for functionality
    - Check all links for accuracy and functionality
    - Explain and check ease of user interactivity with web site (e.g., links to move around web site—ability to get to home easily)

3. Demonstrate math skills (e.g., binary, hex, decimal)
    - Demonstrate the conversion of binary to decimal and hex and back again
    - Show the ability to manipulate different numbering systems
4. Explain the steps required in scientific problem solving and troubleshooting
    - List the five steps in troubleshooting (i.e., define the problem, isolate the cause, plan the repair, confirm the results, document the outcome)
    - Demonstrate the use of troubleshooting techniques to solve a hardware or software problem
5. Explain the importance of testing during periods of product development
    - Explain the development of test data necessary to run test on software
    - Apply test data to program code
6. Demonstrate a fundamental understanding of programming (e.g., P variable, functions, arrays)
    - Write a small modular program using variables
    - Describe a class and objects